

WHAT IS CLAIMED IS:

1. A method of processing digital communication signals in a system including a plurality of buffers, the method comprising:

processing from all known paths of a first group of symbols, wherein buffered digital samples corresponding to the symbols start in a first buffer and end in a second buffer, and receiving samples at a third buffer during the processing of symbols;

processing from all known paths of a second group of symbols, wherein buffered digital samples corresponding to the symbols start in the second buffer and end in the third buffer, and receiving samples at the first buffer during the processing of the symbols; and

processing from all known paths of a third group of symbols, wherein buffered digital samples corresponding to the symbols start in the third buffer and end in the first buffer, and receiving samples at the second buffer during the processing of the symbols.

2. The method of claim 1, wherein the plurality of buffers hold a number of digital samples, the number being adjusted for communication conditions.

3. The method of claim 2, wherein the communication conditions include the communication technology and anticipated maximum useful multi-path delay in the environment.

4. The method of claim 1, wherein received information relevant to a given group of transmitted symbols is processed in one iteration, without a need to store intermediate results for the given group of transmitted symbols.

5. The method of claim 1, further comprising turning off a receiver subsystem and continuing to process received symbols in the plurality of buffers.

6. The method of claim 1, further comprising tuning a receiver to a first channel, storing received symbols from the first channel, and tuning the receiver to a second channel.

7. The method of claim 6, further comprising processing symbols received from the first channel during extra cycles of processing while the receiver is tuned to the second cycle.

8. The method of claim 1, wherein the first, second, and third paths have different sampling rates.

9. A method of processing digital communication signals in a system including a plurality of buffers, the method comprising:

processing symbols corresponding to a first group of symbols to be processed and from all known paths, wherein the symbols in a first path start in a first buffer and end in a second buffer, and receiving samples at a third buffer during the processing the first group of symbols;

processing symbols corresponding to a second group of symbols to be processed and from all known paths, wherein the symbols in a second path start in the second buffer and end in the third buffer, and receiving samples at the first buffer during the processing of the second group of symbols;

processing symbols corresponding to a third group of symbols to be processed and from all known paths, wherein the symbols in a third path start in the third buffer and end in the first buffer, and

receiving samples at the second buffer during the processing of the third group of symbols; and

adapting duration time of the processing of the first, second, and third groups based on channel and signal conditions.

10. An apparatus to process digital communication signals, the apparatus comprising:

a plurality of buffers;

a processing unit; and

programmed memory having instructions directing the processing unit to process the digital samples corresponding to a group of symbols to be processed in a plurality of buffers, the digital samples starting in a first buffer of the plurality of buffers and ending in a second buffer of the plurality of buffers;

wherein the digital samples are received at a third buffer of the plurality of buffers during the processing of the digital samples.

11. The apparatus of claim 10, further comprising input and output busses operable to permit random use of the plurality of buffers during processing.

12. The apparatus of claim 10, wherein symbols are processed in a different group of buffers after a process iteration is complete.

13. A method of processing digital communication signals, the method comprising:

receiving a communication signal at a receiver;

communicating digital samples from the received communication signal to sample buffers, wherein the digital samples include symbols; and

processing the symbols in a first group of sample buffers and receiving digital samples from the receiver at a second group of sample buffers.

14. The method of claim 13, further comprising, after symbols in a symbol path are completely processed, designating sample buffers in the first group of sample buffers as being in the second group of sample buffers; and designating sample buffers in the second group of sample buffers as being in the first group of sample buffers, whereby sample buffers are rotated between processing iterations and digital sample receiving operations.

15. The method of claim 14, wherein sample buffers in the first group of sample buffers designated as being in the second group of sample buffers include all the sample buffers in the first group of sample buffers except a sample buffer having an end of a symbol path.

16. The method of claim 15, further comprising shutting down sample buffers when sufficient processing is complete.

17. A method of processing digital communication signals in a system including a plurality of buffers, the method comprising:

processing symbols corresponding to a first group of symbols to be processed and starting in a first buffer and ending in a second buffer, and receiving samples at a third buffer during the processing of the first group of symbols;

processing symbols corresponding to a second group of symbols to be processed and starting in the second buffer and ending in the third buffer, and receiving samples at the first buffer during the processing of the symbols; and

processing symbols corresponding to a third group of symbols to be processed and starting in the third buffer and ending in the first buffer, and receiving samples at the second buffer during the processing of the symbols.

18. A method of processing digital communication signals in a system including a plurality of buffers, the method comprising:

processing from all known paths of a first group of symbols, wherein buffered digital samples corresponding to the symbols start in a first buffer and end in a third buffer, and receiving samples at a fourth buffer and a fifth buffer during the processing of symbols;

processing from all known paths of a second group of symbols, wherein buffered digital samples corresponding to the symbols start in the third buffer and end in the fifth buffer, and receiving samples at the first buffer and second buffer during the processing of the symbols;

processing from all known paths of a third group of symbols, wherein buffered digital samples corresponding to the symbols start in the fifth buffer and end in the first buffer, and receiving samples at the fourth buffer and the third buffer during the processing of the symbols;

processing from all known paths of a fourth group of symbols, wherein buffered digital samples corresponding to the symbols start in the first buffer and end in the third buffer, and receiving samples

at a second buffer and the fifth buffer during the processing of the symbols;

processing from all known paths of a fifth group of symbols, wherein buffered digital samples corresponding to the symbols start in the third buffer and end in the fifth buffer, and receiving samples at the fourth buffer and the first buffer during the processing of the symbols; and

processing from all known paths of a sixth group of symbols, wherein buffered digital samples corresponding to the symbols start in the fifth buffer and end in the first buffer, and receiving samples at the second buffer and the first buffer during the processing of the symbols.

19. The method of claim 18, wherein each of the plurality of buffers holds a different number of digital samples based on communication conditions.

20. The method of claim 19, wherein the communication conditions include multi-path delays and waveform features.

21. The method of claim 18, wherein the paths are from a plurality of base stations.

22. An apparatus to process digital communication signals, the apparatus comprising:

a plurality of buffers;

a processing unit; and

programmed memory having instructions directing the processing unit to process the digital samples corresponding to a group of symbols to be processed in a plurality of buffers, the digital samples

starting in a first buffer of the plurality of buffers and ending in a second buffer of the plurality of buffers;

wherein the digital samples are received at a third buffer of the plurality of buffers during the processing of the digital samples, and wherein the processing unit is operable to select digital samples or an intermediate result from a buffer coupled to the processing unit.